HAS THE U.S. LANDING CRAFT AIR CUSHION ACCOMPLISHED THE MISSIONS OF THE NAVAL EXPEDITIONARY FORCES, CONSIDERING LANDING CRAFT HISTORICAL DEVELOPMENT AND CURRENT EXPEDITIONARY OPERATIONS?

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirement of the degree

MASTER OF MILITARY ART AND SCIENCE

by

ROBERT P. IRELAN, LCDR, USN
B.A., Miami University, Oxford, Ohio, 1984

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This study determines that a current analysis of the LCAC in expeditionary missions could be accomplished by studying predominatly the historic roles of the landing craft. Roles that focus primarily on the landing craft as the primary movement of equipment and troops to the shore from amphibious shipping at sea. Current operations take into account the ability of the LCAC to operate from beyond the horizon. With the LCAC's speed and manueverability what role will it have in the expeditionary doctrine of Operational Maneuver from the Sea? Deployment of landing craft including the LCAC is, for this study, delivered to the area of operations and then utilized for amphibious operations.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

HAS THE U.S. LANDING CRAFT AIR CUSHION ACCOMPLISHED THE MISSIONS OF THE NAVAL EXPEDITIONARY FORCES, CONSIDERING THE LANDING CRAFT HISTORICAL DEVELOPMENT AND CURRENT EXPEDITIONARY OPERATIONS? by LCDR Robert P. Irelan, USN, 70 pages.

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

Introduction

In today's ever-changing world, the United States military is called upon to respond to crises as well as maintain a presence around the world. The Naval Expeditionary Force (NEF) including the United States Marine Corps (USMC) has been the force of choice for the recent range of embarked missions. Due to the rapid response time required of modern crisis, the NEF has been formulated as the best solution. The method of delivery of troops and equipment for these NEFs has traditionally been the displacement landing craft, conducting the ship-to-shore movement of the USMC, as well as other U.S. military forces. As doctrine for conducting amphibious operations with NEFs continues to evolve, naval forces are now progressing towards the concept of Forward . . . from the Sea. This naval doctrine underscores with USMC doctrine of Operational Maneuver From The Sea speed and maneuverability. The landing craft currently used to support this new as well as current doctrine is the Landing Craft Air Cushion (LCAC). A hovercraft is relatively old technology, having been fielded over fifteen years ago.

This thesis will evaluate the roles and missions of the LCAC in conducting the amphibious, ship-to-shore movement. The evolution of the landing craft in amphibious warfare, will provide an understanding for the genesis of over-the-horizon warfare. Thus, an understanding of the historical significance of the LCAC will lead to the conclusion of what role the LCAC plays or can play in the changing roles of conventional amphibious operations.

To understand the roles and missions of a NEF, it is important to lay the groundwork for understanding naval expeditionary warfare (NEW). The United States is in an ironic position with regard to amphibious warfare. First, it clearly possesses the world's largest and most advanced amphibious fleet in the world. At the same time that fleet has gotten considerably smaller as changes in military art, geostrategic context, and national military strategy take hold. This amphibious fleet can conduct a waterborne ship-to-shore movement from shipping that can range in distance from one-half mile to over one-hundred miles from the landing zone. The critical element to the waterborne ship-to-shore movement is the landing craft.

The three current landing crafts the United States employed are the Amphibious Assault Vehicle (AAV), Landing Craft Utility (LCU), and the LCAC. The LCAC is a nondisplacement landing craft and the LCU a conventional displacement landing craft is an integral parts of the ship-to-shore movement. This research will differentiate the capabilities of the AAV from the landing craft (LCU and LCAC) but will not study the AAV in detail; however, an occasional reference will be made to it. The AAV is operated, funded, and maintained by the USMC; while landing craft including the LCU and LCAC are operated, maintained, and funded by the United States Navy. This is an issue of bureaucratic-service politics that this thesis will not address.

The LCU which is a displacement type of landing craft will be the first described. The LCU is able to transport a vast array of vehicles and equipment, including three M1 tanks or up to 400 fully combat equipped troops. The LCU can transit at speeds between eight to twelve knots, and tactically operate at distances less than ten nautical miles from the landing beach. It is the direct heir of the landing craft of World War II and so is evolutionary in nature.

The LCAC, is a nondisplacement and landing craft, and the LCU, a conventional displacement landing craft, are both integral parts of the ship-to-shore movement. The LCAC, like the LCU, can transport troops; however, it is limited to only twenty-five troops carried

internally. A wide variety of vehicles including four Light Armored Vehicles or one M1A1 tank can be carried by the LCAC. Operating speeds for the LCAC are in excess of forty knots over water (sea state limited) and ten knots over land. Sea state is a measure of wave height, period, and wind speeds, the higher the sea state the more adverse the conditions.

With the LCU and LCAC as the primary landing craft, it is significant to introduce their operating characteristics. "Landing craft numbers currently are at 82 LCACs and 38 LCUs these numbers reflect totals. Current projections are for 90 LCACs. Specific LCU measurements are as follows: Displacement: 200 tons, Length: 134.9 ft, Width: 29 ft, Crew: 14, Range: 1200 miles, Speed: 12knots, Lift Capacity: 170 tons, IOC: mid 1960's." [1] The LCAC general characteristics are as follows: displacement: 151 tons, length: 87 feet 11 inches, width: 47 feet, crew: 5, range: 200 miles at 40 knots with payload, speed: 46-plus knots, IOC 1982, and builder: Textron Marine and Land Systems.

It is important to note that past amphibious doctrine has always emphasized maximizing the movement rate ashore. Movement rate is defined as the rate at which troops, equipment and supplies are delivered to the beach. This has traditionally been accomplished by displacement type landing craft assaulting the landing zone from less than ten nautical miles from the shoreline. The buildup of combat power ashore was directly proportional to the landing craft movement rate. Famous amphibious landings involving thousands of landing craft are chronicled throughout the Second World War.

It is important to introduce the U.S. amphibious shipping from which landing craft operate. Except for the Landing Platform Helicopter (LPH), two nearing decommissioning, all landing craft can be operated from the current U.S. amphibious ship types. Those ships include the following types. The Landing Ship Dock (LSD) has three classes: (1) Pensacola class (LSD 36 - LSD 40): in service 1967, displacement: 14,000 tons (fully loaded), length: 553 feet,

capacity: three LCACs or three LCUs; (2) Whidby Island class (LSD 41 - LSD 48): in service 1985, displacement: 15,939 tons (fully loaded), length: 609 feet, capacity: four LCACs or two LCUs; and (3) Harpers Ferry class (LSD 49 - 52): in service: 1995, displacement: 16,708 tons (fully loaded), length: 609 feet, capacity: two LCACs or one LCU. Landing Helicopter Assault is Tarawa class (LHA 1 - 5): in service: 1972, displacement: 40,000 tons (fully loaded), length: 810 feet, capacity: one LCACs or four LCUs. The Landing Personnel Dock (LPD) is Austin class (LPD 4 - 15): in service: 1965, displacement: 17,000 tons (fully loaded), length: 570 feet, capacity: one LCACs or one LCU. The Landing Helicopter Dock is Wasp class (LHD 1- 6): in service: 1985, displacement: 42,000 tons (fully loaded), length: 840 feet, capacity: three LCACs or one LCU.

Amphibious shipping can carry a varied amount of landing craft, including the LCU and the LCAC. The newer constructed LHD and LSD 41/49 classes were specifically designed from the keel up to support the LCAC in expeditionary operations. However, the older LHA, LPD and LSD-36 classes have been modified to carry the LCAC in limited numbers and with very limited onboard support.

To develop further the concepts of amphibious warfare, it is important to understand current deployment procedures. The United States Navy deploys as an amphibious readiness group (ARG), consisting of three amphibious ships. The ARG is built around a big deck amphibious ship (LHA, LHD, or LPH) carrying the marine composite air squadron; it acts as the key command and control platform of the ARG. The other two ships include one LPD and an LSD. As a note, the exception to the current three-ship ARG is a LPH ARG. This ARG consists of four ships due to the absence of the well deck on the LPH.

Considering a notional ARG deployment, the number of LCUs will vary from one to four depending on the big deck ship. Depending on the ship type, LHA or LHD will determine

the number of LCUs or LCACs. The LHA by design carries four LCUs; on the other hand, the LHD was designed to operate with the LCAC and therefore can only carry one LCU. The number of LCACs in the ARG will vary between four and six based on ship mix and will carry approximately fifteen Amphibious Assault Vehicles. Other capabilities lie in the units assigned to the ARG, such as U.S. Navy Seals and Explosive Ordinance Disposal (EOD) details, as well as, USMC force reconnaissance. Their crafts primarily consist of the Rigid Hull Inflatable Boat (RHIB) and Combat Rubber Raiding Craft (CRRC). One of the other organic craft to the ARG, is the Landing Craft Personnel Light (LCPL) a nonbeaching command and control craft used for amphibious operations. The LCPL is organic to each ship of the ARG and serves as an all-around utility boat.

Background

Current United States amphibious shipping includes a total of thirty-six amphibious ships: twelve LHA/D or LPHs, twelve LPDs, and twelve LSDs. This thesis will not discuss the USMC Maritime Pre-Positioning Squadron (MPPS). Designed to preposition equipment afloat, and marry up as necessary the USMC personnel with the equipment to respond to any crisis. Note the MPPS requires a benign environment and has no assault capability. The USMC MPPS program has no impact on amphibious shipping concerning this study and does not operate with the LCAC.

No discussion of amphibious hardware and deployment can deal with the role of LCAC, except in the context of the current roles of NEFs in the national military strategy. The two current roles of NEFs are presence missions and crisis response missions. Presence missions are fulfilled by deploying forces, currently there are two to three ARGs deployed. A measure of crisis response is amphibious lift. The "Mobile Requirement Study," conducted in the early

nineties to determine amphibious lift requirements in a two major regional conflict (MRC). "The study calls for 3.0 Marine Expeditionary Brigade (MEB) equivalent of surge lift for crisis response. However, due to fiscal restraints that requirement has been limited to programmatic goal of 2.5 (MEB) equivalent of surge lift."[2] Current shortfalls in vehicle lift are being alleviated by Navy initiatives to maintain several amphibious ships in the Naval and Ready Reserve Force. This will augment vehicle lift until the LPD 17 class is commissioned around 2002.

Since landing craft employment is historical in nature and current operations are coming from evolving doctrine, a clear and concise understanding of the newest concept of OMFTS is required. This will determine the utility of the role the LCAC has in current operations and its origins.

> Rapidly projecting decisive military power is key to the National Military Strategy in which Marine amphibious and maritime prepositioning forces play a critical role. Revitalizing the necessary platforms and improving the effectiveness of these expeditionary forces is a major goal. To fully exploit development of these capabilities, the Marine Corps will consistently blend future technology with newly developed operational concepts. Today, the Navy-Marine Corps team is rapidly implementing our strategic and operational concepts set forth in the White Papers of Forward . . . from the Sea and Operational Maneuver from the Sea (OMFTS) to take full advantage of the littoral environment and the maneuvering space it provides. Emerging technology now makes the OMFTS concept a near-reality and enables a tremendous increase in the flexibility, agility, and lethality of our Marine expeditionary forces while significantly expanding our Naval power projection capabilities.[3]

The LCAC is one of the three legs of this OMFTS concept. The other two legs have not entered the fleet as of yet, nor will they within the next five years. They include the Advanced Amphibious Assault Vehicles (AAAV) and the V-22 Osprey. Both of these platforms will allow NEFs to fully operate from over the horizon. The LCAC thus far is the only one of the legs that has been tested successfully in operations. Also it is important to note that the LCAC has been in service for over fifteen years.

Throughout history, nations have chosen to conduct amphibious landings to gain an advantage over their enemies. The success of the amphibious landing during World War II and the Korean War illustrated that even in the age of massive technological advances, a littoral country faces a threat from the seas at any given time. As warfare changes from major battles of attrition to military operations other than war, the NEF takes on greater importance. With the arrival of the LCAC, the NEF now has the capability of projecting heavier forces from beyond the horizon.

The United States is currently the sole deploying maritime power with the LCAC. With the LCAC and the helicopter these deploying forces have the ability to conduct an attack from over the horizon. The question of the LCACs utility is in the role it will play as the United States Marine Corps observes the evolution of their OMFTS doctrine. With its forty-plus knots of speed and ability to operate from over the horizon, the LCAC will be the mainstay of the assault landing craft for the NEF. This is due to no other landing craft construction programs, other than the LCAC are being undertaken. The LCAC achievements in recent operations including Desert Storm, Desert Shield, Somalia, Liberia, and Haiti have shown that the United States Navy intends to make it the landing craft of choice regardless of the operation.

This study will research the utility of the LCAC in current operations as well as its supporting the USMC concept of maneuver warfare. The increased response time required of NEFs illustrates the necessity of being able to operate from greater ranges, with speed and maneuverability.

Purpose of the Research

This thesis is intended to research the ability of the LCAC with naval forces to fulfill current landing craft requirements and to asses the capability of it to perform in OMFTS.

Specifically, it is intended to answer the question: **Has the Landing Craft Air Cushion accomplished the missions of the Naval Expeditionary Force, considering the landing craft's historical development and current expeditionary operations?**

This primary question involves the following subordinate questions:

1. Was the LCAC the logical choice for a landing craft in the normal evolution of amphibious warfare?

2. Can the LCAC maintain its viability, even though it will have been in service in excess of twenty years before the AAAV and V-22 are in full operation?

3. Has the LCAC performance in recent missions indicated a significant advantage over displacement landing craft or helicopters?

4. Does the LCAC complement predict amphibious shipping force structure?

5. Is there a need for over-the-horizon operations based on current threats?

Scope and Limitations

The following assumptions apply throughout the research and conclusion of this thesis: Naval and Marine Corps doctrine will continue evolving to fully support operational maneuver from the sea. The United States will maintain a superior proficiency in conducting amphibious operations, relying primarily on NEFs to conduct these operations. No significant change will occur in amphibious shipping requirements and ship numbers. During this study, there will remain a requirement for 12 ARGs and 2.5 MEB equivalent of lift.

Limitations of this study include resources and time constraints. The research relied primarily on local sources and Internet sources. Original materials where unavailable through traditional library services. Since OMFTS is evolving, documentation was nonexistent;

however, extensive historical material was available. Classified materials are not used or cited in this study.

In addition this research will not address the following issues associated with amphibious requirements: (1) Displacement versus nondisplacement landing craft and advantages versus disadvantages as cost per benefit; (2) The need or requirement for the AAAV or V-22 Osprey to supplement or replace LCAC; (3) The requirement for OMFTS, and the debate of OMFTS and traditional operations. These issues in and of themselves could be addressed by their own research.

This research will stay within the realm of the historical development of the LCAC and evaluate the LCACs performance in current missions to include OMFTS. This study follows the following general outline. Chapter two, Literature Review; chapter three, Research Design; chapter four, The Evolution of the Landing Craft from Gallipoli to Operation Desert Storm; chapter five, Current Roles and Missions of the LCAC; and chapter six, Conclusions and Recommendations.

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[1]The United States Navy Fact File, HTTP://www.navy.mil/navpalib/factfile/ships/ship-lpd,lha,lsd., 04 Nov, 1996.

[2]USMC 1996 Concepts and Issues Chapter 2-27, HTTP://www.usmc.mil/r-c&i96/22b6.htm, 16 Aug, 1996

[3]USMC 1996 Concepts and Issues Chapter 2, HTTP://www.usmc.mil/r-c&i96/22b6.htm, 16 Aug, 1996

CHAPTER TWO

LITERATURE REVIEW

A considerable amount of information is available in the form of books, professional journals, government publications, military periodicals, and internet resources. The primary source of literature was the Combined Arms Research Library facility at Fort Leavenworth, Kansas.

Books and publications were extremely helpful thus far in addressing both historical perspectives and modern doctrinal changes. They include the following: High Seas: The Naval Passage to an Uncharted World by Admiral William A. Owens, Sea Soldier in the Cold War, by Joseph Alexander and Merrill L. Bartlett, and Forward . . . From the Sea by the Department of the Navy.

Admiral Owens addresses in detail the transition of the United States Navy from the cold war to present day requirements. His perspective is quite valuable in forecasting predicted end strengths based on evolving doctrine. Authoring the book while vice chairman of the joint chiefs of staff, he provides a near real-time synopsis based on his experiences. He has commanded the U.S. Sixth Fleet and NATO's Naval Striking and Support Forces, Southern Europe. Although a recent publication, 1995, Admiral Owens does not concentrate his writings solely on amphibious roles and missions. He addresses the Navy as a whole, including aircraft carriers, cruisers, destroyers, submarine, amphibious shipping, and naval aviation. Owens emphasis a shift from command of the sea to operations in the littorals.

Sea Soldier in the Cold War, by Joseph Alexander and Merrill L. Bartlett, provides an operational history of amphibious warfare and an in-depth look at amphibious operations post-World War II. The authors address the major operations involving the USMC including the Vietnam War, the Falklands, and Desert Storm. Bringing a unique perspective to their writings, both authors were USMC officers involved in great detail in amphibious operations. Amphibious shipping and the evolution of amphibious shipping requirements are also addressed in detail in the reading. The authors provide a chronological list of events both in procurement of landing craft and the technological change in crafts. The authors concluded the text with future perspectives in amphibious warfare. They are proponents of maneuver warfare and view the LCAC, AAV, and Opsrey as a viable future team.

Forward . . . From the Sea, is a naval publication on how the U.S. Navy will conduct operations, as well as predict future operations. This doctrine provides a reliable source of evolving naval doctrine. Forward . . . From the Sea is a follow-on publication from the . . . From the Sea, white paper; the USN realizes that the expeditionary team of the USN and USMC will be the method that national military strategy relies on to respond in a crisis. The document clearly states that the structure of Navy and Marine forces will be to strike rapidly from great distances out to sea. The littorals will be the areas of concern for this evolving doctrine with the emphasis away from the traditional "Blue Water" to littoral operations. With the Marine Corps OMFTS as a complementary document to Forward . . . From the Sea, the NEF missions are being more clearly defined.

Another supportive document is Naval Warfare Publication (NWP) 22-3, Ship-to-Shore Movement, an excellent primer on the tactical employment of both displacement and nondisplacement landing craft. It is a source document for operations involving the waterborne and helicopter-borne amphibious ship-to-shore movement. The operator or planner can derive

specific answers to concerns in the coordination, time considerations, and the planning of the ship-to-shore movement. Detailed lift capabilities and planning factors for lifting Marines, vehicles and equipment to the landing zones are provided.

Periodicals that were reviewed included: the Marine Corps Gazette, the US Naval Institute Proceedings, and the Amphibious Warfare Review. All three periodical provided source articles in amphibious operations both historically and present. Several articles provided insight into future trends and developments. Specifically the LCAC, amphibious lift, and OMFTS were addressed in several articles. These publications have proven to be a great source for trends and evaluations of the role the LCAC performs in OMFTS.

The Marine Corps Gazette, published as a professional journal for the USMC, provides a perspective of the Marine who has to transition ashore from amphibious shipping. The articles reviewed demonstrated how the LCAC plays an integral part in assessing the functionality of OMFTS, providing differing opinions and facts.

US Naval Institute Proceedings is a professional journal which contributed greatly to this study. US Naval Institute Proceedings articles concentrated on the U.S. naval officer perspective, but were not limited to that scope. The articles that supported some of the research of this thesis, specifically those that concentrated on amphibious shipping and modern amphibious doctrine, included: "Launching the New Assault Wave" (November 1987); and "Operational Maneuver from the Sea" (August 1994).

Amphibious Warfare Review, the third primary professional journal, provided an even different perspective of amphibious warfare and its changing roles and missions. Articles were authored by civilians, retired military, and active duty military personnel. Research worthy articles that were reviewed included: "High Performance Craft in U.S. Marine Operations"

(Summer/Fall 1992); "Continuing the Assault by Boat and by LCAC" (Summer/Fall 1992); "Maneuver Warfare From the Sea--Honing the Fighting Edge" (Winter/Spring 1992).

Finally, a source utilized frequently was the Internet. An unknown entity for research, various "Homepages" both governmental and nongovernmental alike were available that provided sources of information. Various links referenced included: USMC, U.S. Navy, the Marine Corps University Homepage and others. These links made it possible to research and review both obvious and obscure details of amphibious warfare and LCACs. The Internet is the most rapid source in determining if changes have occurred. It is well in advance, in timeliness, of the published word. The difficulty in this resource is that the "roadmap" is not adequately defined, and resources can tend to be temporary.

CHAPTER THREE

RESEARCH METHODOLOGY

As a first step in the research process, the author identified a significant body of literature on amphibious topics dealing with the amphibious ship-to-shore movement and reviewed it for relevance. These works helped to support, clarify, and finally answer the subordinate questions of the thesis. As the subordinate questions were answered, a logical, researched progression was reached in determining if the roles and missions of the NEF are supported by the LCAC.

To resolve the thesis question, the following issues were addressed in detail: (1) the historical significance of the landing craft employment and evolution, on changing doctrine, concentrating specifically on the impact that the LCAC has had in changing doctrine; (2) the use of the LCAC in operations other than war (OOTW) and OMFTS; and (3) the development of conclusions and recommendations based on the findings. The following brief summary further describes the research methodology.

Historical Significance of Landing Craft

This investigation of the historical significance will concentrate on the role the landing craft has played in enabling amphibious operations throughout modern history; with an assessment of their importance to modern amphibious operations, conclusions about the LCAC can be drawn. By studying the change in technology and the impact it had on the development of landing craft and by completing a historical analysis, a reinforcing argument can be made for

the requirement for the LCAC. Considering historical requirements, is there a need for a high-speed maneuverable landing craft that can support OMFTS. It is clear in amphibious warfare history that the landing craft redefined amphibious operations; the first true landing craft was designed less than seventy-five years ago. In that time, small, slow landing craft to high-technological, high speed seventy-five-ton lift capacity LCACs have evolved. A shift, in what equipment is moving to the beach and the time required for the equipment to get there via landing craft, is the cause for this change.

By an analysis of the historical development of amphibious doctrine, a logical genesis of the landing craft can be concluded. The amphibious operations prior to 1930 were amateur in nature resulting in inconsistencies in the achievement of the desired end state. Amphibious disasters, such as Gallipoli, clearly point to the need for standard doctrine with developed procedures for employing amphibious equipment. The great amphibious operations during World War II and the later battles would employ the basic doctrine evolved in the 1930s. Procedures that were developed during the amphibious renaissance incorporated the first truly effective landing crafts, those being the Higgins Boats. These crafts were the forerunner of the modern day landing crafts. Important to the study is an understanding of landing craft development to compare the utility of the LCAC.

The great challenge to amphibious operations came with the appearance of nuclear weapons, which many supposed would radically reduce the utility of such operations in general wars. However, the local wars of the four-plus decades of the cold war confirmed the utility of amphibious operations. With the revolution in military affairs, especially the appearance of high-precision weapons, questions are once again being raised about the future of amphibious operations. It is in this context that the LCAC's special capabilities take on their significance for the future evolution of amphibious operations in a wide range of missions.

By closely examining the Falklands conflict of the 1980s and other operations, a conclusion can be made concerning the evolution from near land amphibious operations to over-the-horizon operations. Due to the threat from antiship cruise missiles and other enemy surveillance technology, amphibious operations will need to take place from over the horizon. Coupled with the need for covert operations and expanding maneuver space, the historical drive to over the horizon will be studied.

Landing Craft Air Cushion Roles and Missions

In OOTW the LCAC with its speed and operating radius has become a part of naval expeditionary forces. With a changing world, the military is called upon to respond to numerous simultaneous conflicts less than war, requiring limited military intervention, such as a noncombatant evacuation operation (NEO), Somalia (1990) or disaster relief, Bangladesh (1991). Since today's expeditionary forces seem to be concentrating on OOTW it needs to be determined if the LCAC assists in these operations or if it is more of a hindrance, once the scale, scope, duration, and objectives of OOTW in which the LCAC would participate need to be defined.

As amphibious warfare changes, so do the requirements involved in the ship-to-shore movement. The number of amphibious ships during World War II exceeded 200. The low numbers of amphibious ships today tell of a changing evolution. United States amphibious ships today number only thirty-six and are split between two coasts. The critics of the LCAC believe there is no longer a need for landing craft. Also, critics believe that the United States no longer possesses an amphibious assault capability, so why finance the LCAC. It is significant to examine the design criteria for the LCAC and to answer the question of whether or not it fulfills

its designed goals. Such questions are: Why did you need amphibious capability in the past? What has changed regarding need, cost, and risk?

Conclusions and Recommendations

OMFTS and Forward . . . From the Sea are significant doctrinal shifts for the United States Navy. Traditionally a blue water operator, the Navy is rapidly changing emphasis based on doctrinal change. The littoral regions are where things are happening today, and the NEFs will be there to support it, or will they? Will doctrine change again? The fundamentalists in the Navy still like to think in terms of blue water. This is the traditional arena for gaining command of the sea, but post-cold war assumptions include the U.S. being unchallenged and so therefore able to project into green and brown waters (coastal and river waters) littoral zones. The deep water is where the SSBNs and aircraft carriers operate and that is what Americans like to see on CNN. The discussion in this area will support the required changes that need to be made to support OMFTS. The recent evolution of . . . From the Sea to Forward . . . From the Sea is less than three years' old. In service since 1982, the LCAC will soon be reaching its twenty-year mark--a significant age, since the AAAV and the V-22, are not to be in service after 2002. This time differential is significant because the AAAV and the V-22, along with the LCAC, complete the vision of OMFTS. Will the LCAC be able to maintain its utility to avoid obsolescence or will its age overtake it? Determining if the LCAC will be obsolete before OMFTS is fully realized is important to the tenets of this thesis.

This leads to the next significant issue to be addressed. The final study is directed at answering the primary question: Does the LCAC support current missions including OMFTS? This research will determine if the LCAC fully supports the current scope of missions including the full-scale exploitation of the OMFTS doctrine. However, like any operating machine,

adjustments can be made to either increase efficiency or drag it down. Recommendations to increase the output of the machine, based on the research, will be made.

CHAPTER FOUR

LANDING CRAFT HISTORICAL DEVELOPMENT

(1915 - PRESENT)

The historical development of the landing craft reflects the significant rise in amphibious operations in the past eighty years. In reviewing the development of the landing craft, it will be necessary to evaluate the role of the landing craft in the following historical amphibious operations: Gallipoli (World War I), the 1930s (the rise of the art), World War II and Inchon (theory in practice), the Falklands conflict, and Operation Desert Storm. By analyzing these battles of historic significance, the development of the landing craft and the evolution of the need for an over-the-horizon landing craft will be demonstrated.

Gallipoli

With Gallipoli in 1915, the modern art of amphibious warfare had dawned uneventfully. With the European powers locked in trench warfare in Belgium and France, the allied powers were eager for a victory. Britain, relying on her mastery of the sea, felt that the spot for a significant victory would be in the Dardanelles, a "Mahanian" choke point controlled by the Turks. Britain, having naval supremacy in the Mediterranean, determined that the Turks were weaker and would be easily defeated.

The initial naval outcome was not as Britain had planned, the feared British Dreadnoughts were unable to force the straits. "In the aftermath of this serious repulse of the navy's power, an important conference took place on the Queen Elizabeth."[1] While it was

determined that naval power could not achieve a victory in the Dardanelles, a ground campaign from the sea would be necessary. The place selected to conduct the assault was the Gallipoli peninsula at the entrance to the Dardenelles. The method of attack that would make this a unique campaign would be an army campaign with the assault coming from the sea. "The initiative had now passed emphatically to the army."[2] Questions now had to be answered, specifically when and where to land, the number of troops to be involved, how to conduct the ship-to-shore movement and how to support the troops from the sea.

The first question would be the choice of beach or beaches to be used in the assault. The Gallipoli peninsula size was 45 miles long and 12 miles wide. The concern was to identify a specific location where a rapid buildup of troops could be accomplished. Battles during this period were fought and won by mass against mass. Therefore, it was going to be crucial to find a suitable land site where the movement rate from the transport ships to the shore could be maximized. Up to this time amphibious assaults were conducted with only hundreds of troops, the Gallipoli operation was going to be an assault involving tens of thousands of troops. To mass troops ashore, it would be necessary for the troop-carrying transports to locate close to the landing sites. The landing site would need to be large enough in area to mass the landing forces. The landing would also require speed to prevent the enemy from out massing the landing forces before buildup could be completed.

With the advent of the underwater propeller and the Marine engine, the ability to land troops on a foreign hostile shore was greatly enhanced. Gallipoli would be the first campaign in amphibious warfare to utilize massive amounts of smaller craft to land troops from transports at sea. The design for these landing craft was nothing extraordinary. They were long narrow boats approximately forty-to-fifty feet long which could carry twenty-to-thirty troops, with no designed beaching capability. Operating procedures for these craft were such that they would

close the beach, ground out, and then drop the equipment-laden troops as close to the landing sites as possible. The troops often times would need to wade ashore. During the landings the troops were vulnerable to arms fire as well as the possibility of drowning before reaching the beach.

While the concept of transporting troops to the beach in smaller vessels was nothing new, doing it in large quantities under enemy fire was in its infant stages. Hydroghraphic considerations, such as the beach gradient, that level of incline as the body of water meets the beach and surf zone, would prove crucial to planning. Too steep of a beach gradient, the landing craft would run a risk of "broaching" turning sideways to the beach; too shallow of a beach gradient the landing craft runs a risk of causing the troops to wade ashore. Although more of a factor in modern displacement landing craft, the beach gradient at Gallipoli was not a real concern; however, it certainly could of significantly impacted the operation if the gradient was adverse.

The quantitative analysis of Gallipoli points clearly the complexities of any amphibious operation. "The Gallipoli operation involved over 75,000 troops at three different beaches and would utilize over 80 transports."[3] This demonstrates that without the command and control assets (no two-way radio communication only continuous wave morse code communication) the success of any complex amphibious operation would be suspect.

With the Turks having adequate time to reinforce their positions ashore, the British realized that the success of the campaign would be the "rapid" buildup of troops ashore. The success of the operation would hinge on the ability to transport troops from ship-to-shore. "Later in the day ships' boats were ostentatiously swung out from the transports, and strings of tows, each consisting of eight cutters and a trawler, were got ready as if for a landing. Towards evening the boats were filled with men, and shortly before darkness fell, the tows headed for the

shore."[4] A detailed plan was developed utilizing the transports, orchestrated in such a fashion as to anchoring the transports close to the landing sites and using an old collier the *SS River Clyde*.

> Owing partly to a shortage of small craft, but more especially to the limited size of the landing places the military plan that the transports should anchor close to shore. The *River Clyde* plan which called for beaching the old collier and allow for the rapid offloading of over 2000 troops.[5]

While the Gallipoli campaign would eventually turn into an embroiled trench warfare fight, by amphibious standards it met its objectives. In analyzing the Gallipoli campaign several lessons can be learned. Lessons that would be observed by the United States Marine Corps. The success or failure of the Gallipoli campaign is not important to the thesis but rather the study of the so-called landing craft and ship-to-shore movement. Since the Gallipoli campaign employed landing craft on a large scale the lessons drawn prove invaluable. Three lessons for consideration are what role the landing craft will play in an amphibious landing, control measures for the use of landing craft, and using the landing craft to maximize ship-to-shore movement.

The role the landing craft plays in an amphibious operation is determined by the characteristics of both the assaulted area and enemy composition. Geography is key in determining if the landing craft can be utilized, obviously as mentioned previously favorable beach hydrography is required. Zones beyond the surf zone are integral in determining if an amphibious assault will be attempted. In the Gallipoli operation the beach hydrography was favorable. The barges were able to be towed in close enough to the beach, the tows were then cut and rowed in to land the troops. Possible problems could have occurred if the troops had to cross a reef or a sandbar or if the rowing time would have been significant. Obviously the longer the amphibious landing force takes in transitioning from sea to land, the longer a force is vulnerable to opposing forces. Geography beyond the surf zone is also used to determine the

feasibility of an amphibious operation. If the land is flat or gently rolling then conditions are favorable for amphibious operations. If the land is steep and provides an advantage to the enemy then amphibious operations are not favorable. Not to say that amphibious operations cannot be attempted, it just becomes crucial for the landing force to maximize the speed of transition from the landing craft to positions ashore. Obviously, high imposing ground makes it difficult for the landing force to transition inland, slowing the force making them quite vulnerable.

Control measures for the landing craft are also critical to an effective landing. Gallipoli demonstrated the need for thorough and preplanned measures for implementing the amphibious assault with landing craft. In the assault on the Gallipoli peninsula, the British failed to account for the delays, missed beaches, unscheduled landings, and the general melee that plays into a waterborne ship-to-shore movement. The landing craft used in Gallipoli were slow, man powered, clumsy to maneuver, often landing out of position. Lack of speed for the landing craft proved quite often fatal. The Turks were able to attack the slow-moving craft as they approached the beach. While the concept of suppressive naval gunfire was used, the timing was considerably off, often times leaving the landing craft exposed to enemy fire.

The final lesson from Gallipoli is the concept of maximizing the movement rate ashore. In an amphibious operation buildup is from zero since no troops or equipment are prestaged ashore. It is vital that the conduct of an operation provides buildup as rapidly as possible. During Galliploi, the landing craft was most critical to the buildup of troops and equipment. As the primary heavy carrier of troops and equipment, the success of the operation depended on the amount of troops and cargo that could be loaded into the landing craft. The amphibious commander must utilize his assets in such a fashion as to provide the landing force commander the required supplies as rapidly as possible. The Gallipoli campaign clearly demonstrated the need for planning the operation. Supplies for the landed troops were slow in coming and the

landed force often times was left to fend for themselves, unsupported before being supplied or resupplied by landing craft.

The Age of the Art

After the conclusion of World War I, an amphibious renaissance occurred, led by Major Ellis, USMC. Based on his study of Gallipoli, Ellis determined the need for closer coordination between the naval and landing elements, improved command and control, and combined operations in all amphibious assaults. The need for better equipment was a critical requirement for new doctrine. The landing craft needed to be reviewed for adequacy and importance in amphibious operations. Ellis, in developing doctrine, had the support of the United States Marine Corps Commandant, General Leujune. The commandant after the problems of the corps in Nicaragua (1920s) was more than ready for the Marines to get back to the basics. The basics being the conduct of amphibious operations.

With the support of the commandant and the theories of Ellis, the Marines embarked on one of the great success stories in doctrinal development. The end product of all this would be the landing operations doctrine issued in 1937. This doctrine would clearly delineate the conduct of amphibious operations, specifically the waterborne ship-to-shore movement.

In the prelude to World War II, amphibious doctrine was able to be tested as it was being developed through complex fleet exercise. Exercises showed the potential of an amphibious operation as very substantial to military operations. One major element was the use of specialized landing craft developed during this period.

> In 1933, the commandant of the Marine Corps established a Marine Corps Equipment Board, composed of eleven members, who served on an additional duty basis. The primary assigned duty of the board was to recommend the types of equipment best suited to the needs of the Marine Corps. [6]

The results of this board and similar boards was monumental to modern amphibious warfare. The landing craft, one of the outcomes of the board, could rapidly conduct the movement of troops from their ships to a hostile shore, correcting the problems experienced in Gallipoli. Three items, from doctrinal development, were identified as requirements: a troop carrier, a vehicle and heavy equipment carrier, and some sort of armor or fire support. With these three essential pieces of hardware in the Marine Corps inventory, the mistakes of Gallipoli would not be repeated.

The first item to be developed was a troop carrier. The Marine Corps was more interested in operating equipment than the development of equipment; therefore, the request for a landing craft was sent to the civilian sector. "In 1935, bids were advertised by the Bureau of Construction and Repair with specific details as to weight and length of the boats desired. The Bureau had in mind the available deck space, handling facilities, and davit strength of the ships of 1935 Navy."[7] The requirements the Marines had for a landing craft were critical in development. The landing craft had to be carried to the theater, launched from larger naval vessels, embark Marines, and finally transit to the beach debarking the troops and cargo.

Landing craft development would continue throughout World War II. Landing craft size had to be of such a nature as to be carried topside of naval ships, lifted up by cargo booms, and set into the water. These requirements would impose weight and size limitations on the landing craft. The notion of launching the landing craft from the well deck of an amphibious ship would not develop until the latter part of World War II. With the deck-launched landing craft, the Marine would be forced to climb from the main deck of a transport ship about twenty feet down into a bouncing thirty-six-foot-boat. The environmental conditions needed to be favorable, any sea state at all would cause the landing craft to oscillate and pitch making it extremely difficult for loading. The craft would then make its way to the beach through unprotected waters and land

on a hostile beach. As the landing craft would approach the beach it would ground out on the bottom and then the wet, cold soldier would climb out. "They were so high forward that Marines debarking had to drop 10 feet from the bow to the beach."[8] An obvious risk was involved in debarking the craft after surviving the trip in to the beach. It was not until Andrew Higgins entered the scene that landing craft construction started to get serious. Higgins' craft started to resolve the seamanship and beaching difficulties that previous designs had encountered.

> The Eureka, also known as the "Higgins Boat" in America, was a boat of promising design. At the time, it was only thirty feet long and had a special shallow draught designed by Higgins. The special features of the boat were considerable power for its size, and a shape of hull from amidships forward to facilitate retraction from the beach.[9]

The Marines had a design that worked and was practical, although acceptance and testing of the "Higgins Boat" did not occur until 1938. Higgins' craft was to be tested against other craft in 1939 at a fleet exercise in the Caribbean, the test was the final proof that the corps now had a personnel landing craft that could support the ship-to-shore movement. Now that the problem of transferring troops to the shore safely was answered, the Marine Corps could practice the new doctrine.

The heavy-lift landing craft for lifting and transporting vehicles to the beach would also be resolved by Higgins. A larger "Higgins boat" would be built that could support tens of tons of equipment and transport it to the amphibious landing area. Since the size of the tank was growing and the Marines had an intense interest in the tank, the heavier-lift landing craft was going to be critical. The final and really last change to the landing craft was the change in the bow. A ramp was designed into the bow to allow a quicker debarkation of troops and equipment. "On a visit to Quantico in April 1941, Major Ernest E. Lissert, Secretary to the Equipment Board, showed Higgins a photograph of a Japanese landing craft with a ramp in the bow."[10] Higgins would go on to design a bow ramp into the Personnel Landing Craft (LCVP) and into

the equipment, heavier-lift landing craft (LCM). The ramp was the final major design in the landing craft until the 1980s and the advent of the LCAC.

The last requirement was for armor and firepower; the piece of new hardware for this mission was the Landing Vehicle Tracked (LVT). This was an armored, tracked landing craft that would provide protection for the Marine inside. The basic concept of the LVT was that of an amphibious tank. Initial landing forces would need fire support up front on the defended beach; the LVT would provide this protection for the landing force. By design, the LVT would maneuver as a tracked vehicle over land and as a landing craft in water.

With all the hardware pieces now in place, it was time to marry up the doctrine with the equipment. The publication of the Landing Force Manual by the United States Navy in 1927 provided a keystone document in amphibious operations. Once again reflecting on the mistakes of Gallipoli, the Marines established a scripted doctrine for an amphibious landing. The manual would specifically address the preparations, embarkation, and landing. Details, such as when to embark, methods of debarking, beach selection, and command and control, were all addressed; specific formations for landing craft and equipment inside the landing craft were illustrated in the manual.

The Landing Force Manual would basically remain unchanged throughout World War II and the Korean War. All the services would be able to reference the set procedures, now documented, for conducting an amphibious assault. The architect behind the manual was of course Ellis and the Commandant, General Leujune, whom had the vision to see it put into practice.

With the art of amphibious warfare on the canvas and training completed, the United States Marine Corps would be ready to meet the challenges on the near horizon. With the doctrine written and the landing craft developed, amphibious shipping and transports would be

the next requirement. Shipping would quickly follow suit based on the British landing ship (LST). All the pieces of the amphibious puzzle were now together: the Marine's doctrine, the landing craft, and transportation to the operating area.

Lessons learned during the time of the art showed the need for superior equipment and formalized doctrine. Ellis in developing doctrine forecast that amphibious operations could be conducted successfully given the right command and control as well as equipment. Gallipoli was not a total failure, with the correct measures in place success could be had in landing on a hostile beach. The Marines would take the doctrine and equipment and then train during regularly scheduled fleet exercises. Key to the success, during this time, was the support of civilian industry, specifically Higgins, and his superior landing crafts. By the time the United States entered the war, the Marines were equipped and rehearsed for the amphibious campaigns they would soon be conducting in the Pacific theater.

Doctrine In Use

With doctrine and hardware developed, World War II would become the proving grounds. "Plan Orange," the war plan against Japan, developed and revised throughout the 1920s and 30s called for an island-hopping campaign in the Pacific. The chief instrument for this campaign would be the United States Marine using amphibious operations. By reviewing Guadalcanal during World War II and Inchon during the Korean War, the significance of equipment, specifically the landing craft, can be illustrated.

One of the sole reasons for the success of the amphibious operation was due to the landing craft and the control and execution of the ship-to-shore movement of the landing crafts. The first amphibious campaign to be reviewed is the Guadalcanal campaign.

> The Guadalcanal campaign, the first amphibious offensive operation to be launched by the United States in World War II, was undertaken by the United States navy and Marine Corps in August, 1942, just eight months after the Japanese had struck their initial blow at Pearl

> Harbor. The objective of this campaign, which was set in motion on short notice with the most limited means, was the initial step in a program designed to safeguard our imperiled lines of communication to Australia and New Zealand, which were in turn vital to the success of future operations projected in the South and Southwest Pacific theaters.[11]

As Zimmerman states this was the first amphibious operation by the United States during World War II; therefore, the operation would rely on doctrine already developed. The landing craft assets available and the amphibious forces in total would be under the command of RADM R. K. Turner, USN. For the operation the landing craft assets would reside on twenty-three ships.

The Guadalcanal campaign consisted of an assault on Guadalcanal as well as Tulagi, an island about twenty miles to the north of Guadalcanal. Since the assault was to be the first wartime amphibious operation, intelligence on beach hydrography for potential landing sites was going to be critical to the operation.

> Beaches on both Tulagi and Guadalcanal were frequently treacherous because of the broad coral formations. In the vicinity of the Lunga, however, and in some spots farther to the northwest, it was possible to bring large craft almost to the shoreline because of the close-in step-to.[12]

Based on the information collected, an amphibious landing would be possible. Right at the onset of the Guadalcanal operation, the importance of the landing craft is evident. Prior to the landing, a rehearsal was conducted near the end of July. General Vandegrift, the Marine division commander, felt that the rehearsal was ineffective due to the lack of landing craft being used. Landing craft had a high incident of breakdown and required constant maintenance attention, it was thought that using them in a rehearsal would risk damaging the craft thereby causing the operation to be delayed or canceled. One of the skills that unfortunately went unrehearsed was the embarkation of the landing force into the landing craft from the transports. The skill of climbing over the side of a ship twenty-to-thirty feet down a cargo net into a bouncing landing craft was never trained. The Marines throughout the Guadalcanal operation would be slow in embarking the landing crafts.

Actual numbers of landing craft available during Guadalcanal (including Tulagi Island) totalled 475: "8 X-Type (30 foot personnel without ramp), 303 LCP(L) (36-foot, without ramp), 116 LCV or LCPR (36-foot landing craft vehicle, personnel with ramp), 48 LCM (45-foot landing craft medium for tanks and trucks, with ramp). The LVT's (amtracs)...of the 1st Marine Division were in addition to the craft listed above."[13] About two-thirds of the Marines were to be embarked in the LCPLs without ramps, while the remainder would be in the landing craft for personnel with a ramp. The Marine vehicles and tanks were to be ferried to the beach via the LCMs.

The time for the landing had come on 7 August 1942. The original scheme for the amphibious assault including the ship-to-shore movement called for the transports to begin debarking from 9,000 yards from the beach, a considerable distance to be traveled by the landing craft. Clearing a lane for the landing craft to travel down to the assigned beach would be critical to the success of the operation. Initial mine-sweeping operations had been conducted the night and day previous to the landings. After the landing was underway and the initial assault waves of landing craft had landed, the transports closed to within 2,000 yards of the beach to expedite the ship-to-shore movement. With the shorter distance, the time for the Marines in the craft would be reduced making them more combat effective.

The landings were basically unopposed, but as far as the orchestration of the landing and the equipment used, it was quite a feat of amphibious mastery.

> Admiral Turner thought that it was a tribute to the basic competence of the boatswain's mates and coxswains manning the 475 rapidly trained and partially rehearsed landing craft, as well as to the soundness of the training guidance received from the many echelons of command above them.[14]

In reviewing, the lessons learned from Guadalcanal concerning the landing craft training comes to the forefront. The craft being all relatively new, training, handling, and other tactics of

the landing craft were as of yet not fully known. As mentioned, 475 landing craft were involved, with the ship-to-shore movement being done from twenty-three "Amphibious" ships. Due to the difficulty of some of the craft grounding, the problems with coral reefs and beach gradients, hydrographic considerations would need to be addressed in future operations. Another lesson learned was in the off loading of men, equipment, and supplies from the beach, after the landings. The first twenty-four hours of the Guadalcanal operation was plagued with the excessive amount of supplies severely congesting the landing areas. Fortunately the landing was mostly unopposed, and ships and boat crews could assist in supply movements. In evaluating the concept of a rapid buildup ashore from numerous landing craft, newly developed landing craft were proven successful in combat. The island-hopping campaigns continued throughout the Pacific theater, while the necessary skills in conducting an amphibious assault by way of landing crafts would continue to be sharpened.

As the war in the Pacific continued to rage, the lessons learned from Guadalcanal would lead to improvements in amphibious operation. Hardware innovations would be rapidly sent to the Pacific theater. Innovations, such as the Landing Ship Tank that could beach and debark Marine equipment and men in a much greater quantity than the LCVPs and LCMs, would prove invaluable in future amphibious operations throughout the Pacific theater. The Landing Ship Dock could ballast down to launch its preloaded landing craft out of a flooded well deck. By 1944, as operations continued the number of amphibious ships rose dramatically. "Old Task Force 62 which sailed so proudly forth to assault Guadalcanal on 7 August 1942, numbered 51 ships. Task Force 51 numbered 495 ships-ten times as large."[15]

The final jewel for amphibious operations in the Pacific theater during World War II was the Okinawa campaign. With over 1,200 amphibious ships and craft and a total landing force of over 180,000 troops, Okinawa's success proved amphibious doctrine was valid. No matter the

size of the operation, by the use of the landing craft in the ship-to-shore movement, rapid buildup ashore could be accomplished against any hostile shore.

Significant outcomes of the Pacific amphibious campaigns were the importance of command and control. This with the rapid build of combat power ashore would prove to be the amphibious doctrine to be used. However, as the victories continued to mount, a significant occurrence at Okinawa would prove to later change the face of amphibious operations. Unaccounted for at the battle was the kamikaze, nothing more than a human-guided missile, the kamikaze would prove deadly to naval shipping. The enemy now had a weapon that could be guided into specific ships with a significant range. This would prove to be the forerunner of the modern-day antiship cruise missile that would prove more lethal in the Falklands. Amphibious ships now faced a significant threat from the enemy's shore. Doctrine would need to be changed from overt to covert operations. The ability to conduct an amphibious operation close to the landing sites was starting to waver.

The success in the Pacific showed the force of choice in amphibious operation to be the Marines. Post-World War II, the United States Marine Corps was tasked as the sole developer of amphibious doctrine. The United States military resting on its laurels was once again called to duty in June 1950 at the outbreak of the Korean War. The UN forces and the Republic of Korea forces experiencing heavy losses were forced to conduct a delaying action on the Korean peninsula. The next major amphibious operation to be addressed would be Inchon during the Korean War.

After United Nations forces had been pushed back to Pusan in southern Korea, MacArthur as commander, decided to go on the offensive; his force of choice was an amphibious landing at Inchon. As the army commander in the Pacific theater, MacArthur had seen the Marines operate and had viewed the effectiveness of landing operations during World War II.

Inchon would pose numerous problems for the landing force. Problems including hydrography, mines, and conducting a landing in an urban environment would need to be addressed.

Hydrography problems consisted of exposed mudflats, due to the tidal ranges and narrow inlets to the approaches to the landing beaches. Mines would be another difficult problem encountered; due to the number of mines used in the North Korea defense of Inchon, the operations would be delayed until appropriate mineclearing steps could be taken. One of the drawbacks to any minesweeping efforts would be the advanced warning of impending operations. This warning gives the defending forces more time to plan and defend against an amphibious assault. These problems would be overcome by the sheer determination of the planners of the attack.

The technology and hardware had changed very little from Okinawa to Inchon. Doctrinally the same tactics were being used. An Amphibious Objective Area (AOA) was being established. A Line of Departure (LOD), boat lanes all were planned prior to the landing at Inchon. Once again preparation of the beaches by air and naval gunfire support would prepare the beaches against the heavily entrenched enemy. As far as the performance of the landing craft, the operation was as successful as previous operations. The troops (USMC) were brought ashore in waves utilizing LVTs, LCVPs and LCMs. "Nearly 200 LCVPs and 70 LCMs soon were joined by 12 LSUs and 18 LVT(A)s, 164 LVTs, and 85 DUKWs disgorged from the yawning wells of the LSTs."[16] The movement rate ashore was rapid; the stationing of amphibious shipping, including transports, would be close to the landing sites. Boat lanes would be one-to-two miles long with amphibious transport shipping anchored about three miles off the beach. With the exception of the LSTs, which actually beached at the landing sites, no threat was posed to amphibious shipping.

As far as lessons learned, no significant new lessons concerning landing craft employment would surface. The effects of mines on the operation would reemphasize the importance of mine clearance operations for an amphibious assault. Inchon would reinforce existing doctrine already established in World War II concerning the ship-to-shore movement and landing craft employment.

Falklands

Over thirty years had elapsed in large-scale amphibious warfare when Argentina would claim the Falklands in 1982. Britain protecting its territory, would reclaim the Falklands by conducting several amphibious assaults. The major change in warfare since Inchon had been in weapons technology, specifically the antiship cruise missile (ASCM.) By studying the effect of the ASCM on naval amphibious warfare, it becomes evident the impact the ASCM will have on the now traditional ship-to-shore movement.

By 1982 Great Britain's amphibious capability had greatly atrophied. Focusing more on NATO commitments and antisubMarine warfare, Britain was ill prepared to conduct a major amphibious operation thousands of miles from the home waters. Through courage and military professionalism Great Britain would be victorious in reclaiming the Falklands. At the start of the conflict the amphibious task force would be quite sparse:

> The ships immediately to hand were *Fearless* which would serve as the headquarters ship and four landing ships (Logistics) (LSLs) *Sir Geriant* and *Sir Galahad* at Devonport and *Sir Lancelot* and *Sir Percivale* at Marchwood. The *Intrepid* was now being recommissioned with her former crew who were haled back from leave and new jobs. *Sir Tristan* was in Belize but the sixth LSL, *Sir Bedivere*, was at Vancouver.[17]

The number of landing craft would be eight LCMs (British version of the modern U.S. LCU) and eight LCVPs. The LSL carried no landing craft and were operated by the Royal Fleet Auxiliary.

With a total of only sixteen landing craft, Great Britain had their total amphibious force ready to conduct amphibious operations against the Argentinians at Falklands.

The capability of the British LCVPs was basically the same as the LCVPs at Inchon; it could carry five tons of cargo or one vehicle or thirty-five men. The LCM on the other hand was quite capable. Launched from the well of the British LPD's *Intrepid* or *Fearless*, it could carry 100 tons of cargo or two tanks or 140 men. The LCM also had the capability of offloading an LSL via its stern gate or bow ramp. One of the major differences between Inchon and follow-on operations including the Falklands would be the decline in the amount of shipping and landing craft used in conducting modern amphibious operations.

The main assault in the Falklands War was carried out at San Carlos Bay on 21 May 1982. The amphibious objective area was approximately a five-by-five-mile square box in the vicinity of the San Carlos settlement on East Falkland Island. The initial assault at 3:30 in the morning, local time, on 21 May.

> Covered by the *Plymouths* guns and with the Scorpions and Scimitars of the Blues and Royals in the bows of the LCUs to provide close support fire. . . .
> The craft made their way down the eight-mile arm of the San Carlos Water. The Marines of 40 Commando went ashore at San Carlos Settlement. No opposition was encountered on either beach and while the Marines made their presence known to the residents, ran up the Union flag.[18]

Once again the success of amphibious landing operations was demonstrated. For the remainder of the assault, the landing crafts were used for shuttling cargo, vehicles, and personnel back and forth to the beach. The buildup ashore was obviously limited by the number of landing craft as well as proximity to the landing sites.

A new development in an amphibious operation was the use of the helicopter to conduct an airborne ship-to-shore movement. Now the amphibious landing could be done by not only the waterborne ship-to-shore movement but also the airborne ship-to-shore movement. The potential

of using a helicopter to land troops also lends itself to increasing the range that operations can be conducted. Airborne assaults could be conducted from over the horizon, where landing craft had to be operated relatively close to the landing sites. At the Falklands, both aircraft and waterborne craft were used, but the focus will be on the waterborne ship-to-shore movement due to the landing craft. The proximity to the landing sites required for British ship-to-shore waterborne movements would prove fatal. Key to all the discussed amphibious operations thus far has been the lack of opposition to landings. The elements have been either surprise, such as the Falklands, or the complete preparation of the landing site via naval and air gunfire, such as Guadalcanal and Inchon.

One of the significant technological advances effecting naval warfare has been the development of the antiship cruise missile (ASCM). Although the ASCM had been employed in the Arab-Israeli War in the early 1970s it had never been used against amphibious shipping. British naval forces would feel the effect of the Exocet ASCM, at the Falklands. The Exocet, a French-built ASCM, had a range greater than 50 nautical miles, a speed of 500 miles per hour and cruised less than 20 feet from the surface of the sea. The Argentinian Exocet was launched from land-based aircraft from airfields in Argentina. The lack of air superiority for the British resulted in losses to naval shipping from not only the Exocet but also aircraft dropping iron bombs. During the war the British would lose *HMS Scheffield* and the *Atlantic Conveyor* to the Exocet ASCM, while they would lose two LSLs, *Sir Tristan* and *Sir Galahad,* to iron bombs. While no amphibious assets would be lost to the ASCM, the potential now existed for an amphibious catastrophe. Shipping that had traditionally been stationed ten miles or less off the beach could now be vulnerable to an ASCM threat. Missiles, that could be launched from naval vessels, aircraft, or even shore, would now place shipping in harms way. A review of the conduct of amphibious operations would be needed based on this new lethal threat.

The risk from a shore-launched ASCM can be illustrated by examining the time-distance equation. An amphibious transport that is operating ten miles from the beach has basically two minutes to react to a ASCM launched from twenty miles away. The time for detection and destruction is so small the probability of defeating the ASCM is minimal. In the Falklands, due to the geography of the islands, reaction times were reduced even more due to limited radar ranges caused by land masking. It is obvious to determine that the maximum detection of an ASCM or any air threat provides a greater reaction time and therefore a greater probability of defeat. The solution is to station amphibious shipping a greater distance from the threat thereby increasing reaction times. Amphibious operations doctrine would need to change to meet this new impending threat; the loss of a major amphibious asset would be catastrophic to any operation.

Desert Storm

Eight years after the Falkland War the United States would be embarking on a major amphibious operation, in the Persian Gulf. The amphibious operations conducted in Desert Storm would consist of thirty-one U.S. amphibious ships, the greatest number of ships since the Korean War.

> A major maritime campaign component centered on preparing for and executing amphibious operations during the ground offensive. For this purpose, the USMC deployed the 4th and 5th Marine Expeditionary Brigade (MEB) and the 13th Marine Expeditionary Unit (Special Operations Capable) (MEU(SOC)) aboard amphibious ships to the Persian Gulf.[19]

The number of U.S. landing craft available on amphibious ships included 17 LCACs, 13 LCUs, and 115 AAVs (LVT). This would be the first time that the LCACs would be used in a conflict. With the LCAC, the Amphibious Task Force (ATF) would now have an over-the-horizon capability. "The landing force consisted of about 17,000 Marines, built around two regimental landing teams, with five infantry battalions, plus supporting arms, including tanks,

antitank vehicles and light armored vehicles (LAV)."[20] Of course, in traditional amphibious doctrine against a defended beach, the AAVs would make up the first assault waves. AAVs, normally launched two-to-three miles from the landing sites, would negate the over-the-horizon capability of the LCACs in a major assault.

One of the major obstacles to the conduct of amphibious operation during Desert Storm was the intense beach fortifications and obstacles as well as the amount of beach mining and sea mining that the Iraqis had employed in their defenses. As seen in past amphibious operations extensive mine clearing operations and beach preparations would be required to eliminate the dangers of an opposed landing. In Desert Storm, higher authority wanted to limit collateral damage to Kuwait that naval gunfire would cause; and with limited mine clearing assets, it would be impossible to clear all the mines. With the preceding criteria it would be evident that any type of large-scale landings in proximity of Kuwait City would face severe opposition from forces ashore and enemy mines. This severe opposition would cause an unacceptable loss of American lives.

During the Gulf War, the U.S. amphibious task force planned and executed five total operations. The range of operations went from raids to a full-scale offload of 5th MEB. The raids that were conducted help to maintain the notion that a full-scale operation would soon be conducted. The operations included the taking of small islands and conducting a demonstration to fix Iraqi forces along the coast. While none of the raids or feints involved the LCU or LCACs, they relied extensively on air assets, an important off-load of 5th MEB did require waterborne landing assets. The extensive use of the LCU and LCACs to expedite the ship-to-shore movement of the 5th MEB men and equipment proved, once again, the utility of waterborne landing craft in maximizing movement rates ashore.

The planning of amphibious operations during Desert Storm took into account the new over the horizon capability of the LCAC.

> An option considered for both a possible assault and a raid was an over-the-horizon (OTH) assault. The concept involves launching heliborne and surface assault waves at extended ranges from the beach. . . .
>
> An OTH assault requires both long-range helicopters and assault craft capable of open ocean operations, both of which the ATF had , but in limited numbers.[21]

In assessing amphibious operations in Desert Storm within the scope of the landing craft, the LCAC played a key role. In demonstrating the potential of conducting an OTH amphibious operation in well-publicized amphibious exercises, Iraq knew the capability of U.S. amphibious forces. Commander in Chief Central Command (CINCCENT) opted not to execute a large-scale amphibious assault. "The ATF trained and organized for amphibious landings, could have carried out such an assault. Using the OTH concept, a smaller landing was planned; both assault options presented the Iraqis with a substantial threat to their seaward flank."[22]

In reviewing the historical development of the landing craft, the nature of amphibious operations is demonstrated. The ability to mass forces against an enemy on a hostile shore permits friendly forces to attack from the sea. With the development of amphibious doctrine in the early 1920s to the practice of doctrine during World War II and Korea, the importance of the landing craft was demonstrated. The ability to mass equipment and men lies in the ability of the landing craft to transport men and equipment to the shore from transports at sea. From the Higgins' boats of the late 1930s to the LCAC of the early 1980s, the ability of assaulting a beach one-hundred miles out to sea at fifty-plus knots has evolved in less than fifty years.

The importance of amphibious operations has ebbed and flowed. From post-World War II amphibious operations to Inchon four years later to Desert Storm in the 1990s, the flexibility of the amphibious landing provides the commander a decisive tool. The observations of amphibious operations in the report to Congress after Desert Storm demonstrate the requirement

for amphibious capability. "Amphibious assault remains one of the more difficult and dangerous military operations. However, amphibious forces provide a forcible entry capability and forward presence (independent of bases on foreign territory), which are of strategic and operational value."[23] Amphibious operations are a unique capability deeply rooted in the United States war-fighting doctrine. The necessity of the landing craft in amphibious operations is embedded as well in naval expeditionary doctrine.

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[1]T. A. Gibson, "Gallipoli 1915," Bartlett, Merrill L., Lt Col, USMC (Ret), Assault From The Sea, Essays on the History of Amphibious Warfare. (Annapolis, MD: Naval Institute Press, 1983), 143.

[2]Ibid., 143.

[3]Sir Roger John Brownlow Keyes, The Fight for Gallipoli, (London: Eyre & Spoottiswoode, 1941), 127.

[4]Ibid., 164.

[5]Ibid., 132-133.

[6]Kenneth J. Clifford, Amphibious Warfare Developments in Britian and America from 1920-1940 (Lauren, NY: Edgewood, Inc., 1983), 108-109.

[7]Ibid., 110.

[8]Ibid.

[9]Ibid., 111.

[10]Ibid., 113.

[11]John L. .Zimmerman, Major, USMCR, The Guadalcanal Campaign, (Washington DC: Historical Division, Headquarters, U.S. Marine Corps, 1949), 1.

[12]Ibid., 16.

[13]George Carroll Dyer, The Amphibians came to Conquer the Story of Admiral Richmond Kelly Turner, Vol. I (Annapolis, MD: Naval Institute Press, 1962), 333-334.

[14]Ibid., 336.

[15]Ibid., 1005.

[16]Lynn Montross and Nicholas A. Canzona, Captain, The Inchon-Seoul Operations Historical Branch, G-3 Headquarters, USMC, (Washington, DC: Gross Point Military Scholarly Press, 1955), 102.

[17]David Brown, The Royal Navy and the Falklands War, (Annapolis MD: Naval Institute Press, 1987), 68.

[18]Ibid., 181.

[19]Department of Defense, Conduct of the Persian Gulf War, (Final report to Congress, Washington, DC: April 1992), 212.

[20]Ibid., 215.

[21]Ibid., 216.

[22]Ibid., 221.

[23]Ibid., 224.

CHAPTER FIVE

LANDING CRAFT AIR CUSHION ROLES AND MISSIONS

An analysis of the LCAC's roles in current and postulated Naval Expeditionary Force (NEF) operations deserves serious attention. Recent doctrinal changes in affecting amphibious warfare have led to the development of operational maneuver from the sea (OMFTS) which relies on high speed and over-the-horizon operations for success. As stated previously, the role the of the LCAC in amphibious operations is that of a primary transport from ship to shore. With the use of greater speed and the ability to traverse over the beach, the LCAC is one of the most versatile platforms available to naval expeditionary forces. The best approach to analyzing LCAC performance is an examination of recent operations involving the NEF and Marine Expeditionary Unit (MEU) operations. Missions that have recently been conducted include the noncombatant evacuation of Liberia, Desert Shield and Desert Storm, etc. OMFTS will also be discussed at the end of this chapter and the importance of the LCAC in this evolving doctrine.

Two Marine Expeditionary Units (MEUs) are deployed at any given time onboard an Amphibious Readiness Group (ARG). As noted earlier, the ARG consists of three amphibious ships operating independently or in concert with a Carrier Battle Group (CVBG). The MEU before the deployment conducts training for specific missions. Operations ranging from the conduct of amphibious raids to military operations in urban terrain are the focus of the training. Specific missions in the training that affect the LCAC include: raid, noncombatant evacuation operation, show of force operations, reinforcement operations, and military tactical deception

operations. Although the MEU trains for other missions, the landing craft's contribution is minimal.

Amphibious Raid

The four basic amphibious operations are demonstration, assault, withdrawal, and raid; with raid being the primary mission of the MEU. Equipped with armored vehicles and specialized weapons the MEU can fulfill specific objectives assigned by the joint task force commander, such as a raid. Typical types of raids are small military force incursions for specific objectives and then withdrawal of forces. An example of a raid would be to disrupt a communications station, by inserting troops in and then extracting them. Basic equipment for the MEU is located on the three ships of the ARG. Equipment includes Amphibious Assault Vehicles (AAV), Light Attack Vehicles (LAV), artillery, jeeps (HMMV) and trucks.

Critical to the amphibious raid operation is the transport of marine equipment, men, and vehicles. This is accomplished by the embarked landing craft to the amphibious transports. In an ARG there are typically four-to-five LCACs and one-to-four Landing Craft Utility (LCU). As presented earlier, the LCU is a displacement landing craft with speeds of eight-to-ten knots and a load capacity of two-to-three M1A1 tanks.

The role the LCAC plays in amphibious raid is in its ability to operate at high speeds and from over the horizon. Typically a raid is conducted covertly, where concealment and surprise are critical. With the LCAC operating from over the horizon, covertness can be initially achieved. Where a LCU or even a helicopter can be picked up by radar, the LCAC is low to the water with a fairly small radar cross section. The LCU constrained with having to operate near shore would sacrifice covertness if engaged in an amphibious raid. Examples of the LCAC's capability include a recent RIMPAC exercise, a naval exercise that includes Pacific Rim nations.

> Three LCAC hovercraft, each capable of transporting four light attack vehicles more than 60 miles over water at speeds in excess of 40 knots, were launched from the USS *Essex* while the ship remained out of sight over the horizon. The LCAC hovercraft smoothly came ashore on an unprotected beach miles away from the actual objective where they offloaded the eight wheeled LAVs. The LAVs deployed to take up screening positions preventing enemy reinforcements from reaching the airfield undetected.[1]

The article above provides an example of the capability and versatility that the LCAC possesses for conducting a raid. Since the LCAC load can consist of either M1A1 tanks, AAVs, or LAVs besides troops and smaller vehicles, the Marines are provided a rapid insertion capability. Critical to the conduct of a raid is the rapid buildup of power for a limited time at a precise location. The objective of the raid is defined by the commander. Raids may also require rapid redeployment of forces back to the ARG. With equipment, such as the LAV, the LCAC can rapidly project power with the degree of mobility required by the raid. Limitations by airlift (CH-53 can externally "sling" one LAV) and the hydrography constraints of the LCU make the LCAC ideally suited for the conduct of a raid if heavier equipment or supplies are required.

The only limitations thus far are range of the LCAC and command and control. The range of the LCAC is limited to 200 nautical miles fully loaded. While the LCU has a greater range, the LCAC can make up its range deficit by speed. Command and control limitations are due to the limited communications capability. Currently the LCAC has no over-the-horizon communications capability internal to the craft. While this is a limitation of the LCAC, all current landing craft experience the same difficulty with long-range communications. Until technology is assimilated to all units, this will be detrimental to OTH operations.

Noncombatant Evacuation Operations

In today's unsettling times naval expeditionary forces have been called upon for several evacuation operations. United States interests abroad have created a rise in the amount of U.S. citizens throughout the world. Protecting these interests has always been a role of the U.S.

military including the Navy and Marine Corps. Recent crises in Somalia and Liberia indicate a requirement for rapid evacuation of American citizens. The force of choice thus far has been the NEF performing the evacuations. The unique capability of the NEF to remain on station and its organic lift capabilities make the best option for crisis planners. With the three-ship readiness group, the NEF has an inherent capability for evacuations. By examining the Liberian evacuation the potential capabilities of the LCAC are evaluated.

In May of 1990, an amphibious task force arrived off the west coast of Africa at the request of the U.S. Ambassador to Liberia. Ongoing civil unrest in Liberia had forced the voluntary evacuation of thousands of U.S. citizens. With still about 200 citizens remaining in the country, the four ships of the ARG remained poised to conduct a NEO. With an evacuation established at the embassy, plans were being examined for the commencement of a full-scale NEO.

"The team commander there insisted that an underwater survey be performed by a group of frogmen to determine if the evacuation beaches were safe for landing craft, but Washington canceled the exercise before it could take place."[2] As evident by the passage, no beach survey was conducted at the crucial evacuation site. With only displacement LCUs and LCMs, the ARG was limited by the type of landing craft it had embarked. Without a proper beach survey, the reliability of using displacement landing craft to conduct the evacuation would have been difficult. With the landing craft unable to beach properly, it would have been unsafe for the nonmilitary evacuees to properly embark the craft. The lack of embarked LCACs in the ARG was the limiting factor for conducting a waterborne evacuation.

Since the LCAC is not limited by beach gradient and can traverse more restrictive obstacles, the team commander would not have required a beach survey to safely land the

LCACs. The ability of the LCAC to go onshore ensures a proper landing site for the embarkation of civilians.

"Early the next morning, the ships of the task force that had been steaming in circles just over the horizon for two months drew closer to shore. Simultaneously, from their decks, helicopters flew off to three sites. The largest group landed 237 combat-ready Marines."[3] Once the order was given to reinforce the embassy, the evacuation forces were inserted. One of the limiting factors to the evacuation was that all troops and equipment were brought in by helicopter, a possible limiting factor if vehicles or heavy equipment is required. The evacuation would have been more difficult if heavy equipment and supplies would have been required.

Another limitation was that the ships of the ARG had to operate close to the beach, which in turn increases the risks to the ships from shore-based weapons. With the LCAC, amphibious shipping can stay over the horizon out of harms way. The LCAC provides desirable options to the commander, such as a rapid buildup of equipment for an evacuation.

The American naval presence remained off the coast with the evacuation ongoing. The numbers of personnel evacuated would grow into the thousands. "Several hundred Americans and thousands of third-country nationals who had succeeded in reaching the embassy compound were evacuated in the next few days."[4] All evacuations and resupply were accomplished by helicopter. The quantity of food and fuel provided by each helicopter was minimal in comparison to that which could have been provided by one landing craft.

Although the evacuation of Liberia was successful, the mission could have turned for the worst if less time had been available. The ability to use only helicopters in an evacuation will not always be an option. Considerations, such as weather, required forces, and antiaircraft weapons, may prevent the use of aviation. The waterborne evacuation may be the only option available to the commander. The LCAC at high speed provides a rapid insertion and evacuation

possible. The advantages of an LCAC over a surface displacement craft are in the LCACs speed and invulnerability to beach gradients.

Show of Force Operations

"Show of force operations. An ability to serve as a show of force to demonstrate the willingness of the U.S. military to rapidly support the political resolve of the United States."[5] Throughout the cold war, deterrence was the method of military structuring. A naval expeditionary force has the unique capability of traveling to a region and conducting military operations within sight of a major coastal region. A NEF can accomplish these operations without violating any territorial integrity of a nation while maintaining a presence for extended periods of time. The potential lethality of these forces is well documented. By using organic assets, such as military aircraft and landing craft, the United States can show force to a potentially hostile nation on short notice.

Chapter four described Desert Shield and Desert Storm as the most recent examples of show-of-force operations. Thirty-one amphibious ships were assembled for the possible amphibious assault of Kuwait. With the embarked landing craft, amphibious forces had the ability of rapidly projecting power ashore. The waterborne assault would be the method of projection. By utilizing the media and conducting several rehearsals, the U.S. amphibious capabilities were demonstrated to Iraq. The ability of conducting assaults at high speed from over the horizon was also advertised to the Iraqis by way of the LCAC. The ability of the LCAC using high speed to maneuver, a force can be projected across a wide front. The fact that the LCACs were embarked was made known via the media to Iraq, thereby demonstrating their potential capabilities.

The presence of the amphibious ships with LCACs on board allowed the amphibious task force commander to demonstrate the forces available for an amphibious assault against Iraq. Using the tenants of amphibious warfare, the task force could strike in mass with conventional landing craft--or with LCACs along a wide front or concentrating at a critical gap. The over-the-horizon capability of the amphibious task force is made credible. The LCAC can provide a high-speed demonstration from over the horizon. The displacement LCUs and LCMs can only assault within the range of the horizon increasing the vulnerability of the ATF. Without the LCAC, the task force commander is limited by range in projecting power ashore.

Reinforcement Operations

A successful amphibious operation relies on rapid buildup from a sea base as a prerequisite. The ability to rapidly reinforce elements of a Marine Air Ground Task Force (MAGTF) is a key issue. Ships of the ATF carry the required supplies, equipment, and men to reinforce or sustain operations ashore. In assessing the size of the MAGTF, the sustainment time is the measure currently used. A Marine Expeditionary Force (MEF) can sustain itself for thirty days while a MEU can only sustain itself for fifteen days. As defined by Amphibious Warfare Review, reinforcement operations are "an ability to conduct operations, particularly at night, by helicopter and/or surface means to reinforce both international and national military forces, that are either organic or external to the MEU."[6] Recent examples of the LCAC being used in reinforcement operations are Desert Storm, the Bangladesh disaster relief efforts, and the Somalia operations. Reinforcement operations are required regardless of the level of conflict. Whether it is ground troops or civilians requiring humanitarian relief, reinforcement is crucial to the success of the operation.

The Desert Storm operations demonstrated the LCACs reliability and capability in performing reinforcement operations. Although amphibious operations were restricted initially to conducting a ruse, USMC forces were delivered ashore in support of operations. General Boomer, Marine Force Commander during Desert Storm, stated: "I did bring the Fifth Marine Expeditionary Brigade ashore on G-day to constitute my reserve for the First Marine Expeditionary Force which was attacking into Kuwait. They were able to land quickly, and one of the reasons was the LCAC."[7] As indicated by General Boomer, the LCAC was used to reinforce the Marine ground operations.

The LCACs high speed ability unconstrained by beach hydrography allows the Marines to provide reinforcements ashore expeditiously. Instead of reinforcements being supplied by slower cumbersome displacement craft, the LCAC can transit to a secure site near the Marine unit needing to be reinforced and deliver required supplies or forces. A limiting factor is in the lift capability of the LCAC. Although lift capacity for the LCAC is 60 tons, the LCU has a greater lift capability of 170 tons. Considering its greater speed the LCAC provides a greater transfer of supplies at distances over ten nautical miles from the desired delivery point. This is due to the slower speed of the LCU versus the LCAC.

The role of the landing craft for reinforcement is deeply rooted in amphibious warfare. With the changing doctrine of OMFTS, the requirement for operating at a greater distance makes reinforcement with conventional landing craft difficult. The LCAC, with faster speed, can operate at greater ranges from amphibious shipping. A changing requirement from forces ashore can be easily supported with the LCAC.

Military Tactical Deception Operations

A valuable tool to the commander is the ability of forcing the enemy into a desired course of action. By providing a deception, the enemy may be forced into providing critical intelligence as to their weaknesses. Once the weaknesses are exposed, the commander can then exploit them to his advantage. In this discussion, tactical deception will be addressed as conducting a demonstration or ruse. The deception occurs by allowing the enemy to focus on the demonstration thereby forcing the opposition into a specified strategy or tactic. The use of the LCAC in a demonstration can be viewed by the recent analysis of Operation Desert Storm and Desert Shield.

Chapter four previously mentioned the LCAC had a significant influence on the operation in the Gulf. The Conduct of the Persian Gulf War: Final Report to Congress April, 1992, described the feint or deception carried out by U.S. Amphibious forces proved pivotal to the success of the ground campaign.

> Using the OTH concept, a smaller landing was planned, which could have been conducted on short notice, if required. Variations of this OTH assault plan were used to conduct the amphibious feints. Both assault options presented the Iraqis with a substantial threat to their seaward flank. In the end, the successes of the theater deception plan and the relatively short ground campaign made an amphibious assault unnecessary.[8]

As described above, part of the deception plan was using over-the-horizon raids and feints to force the Iraqis to commit heavy ground forces to protect the seaward flank of Kuwait. The focus for Iraq was to the sea rather than to the western border.

By using the LCACs in the feints that were conducted, the Fourth Marine Expeditionary Brigade appeared to give an over-the-horizon capability to the amphibious task force commander. With the speed and operating range of the LCAC, the Iraqi defense against an amphibious assault would need to be along a large front. If LCUs had been the only option for the amphibious assault, the Iraqis would have needed less time to build defenses. The LCU due

to its slower speed is not formidable operating from the OTH; the enemy is less likely to be deceived than if LCAC is used.

The goal again of any tactical deception is to force the opponents hand early and to impose maldeployment of forces upon him. The LCAC by its superior speed and range provides a versatile platform to deceive the enemy. The opposition may be forced to consider different defenses in preventing an attack using LCACs. The enemy must increase his surveillance over a greater range and defend along a greater front against the LCAC. With the LCAC being less constrained by beach hydrography, the scope of landing sites where the amphibious assault will take place is greater. Therefore, as in Operation Desert Shield and Desert Storm, Iraq was forced to commit a greater numbers of troops and equipment in defense of the coast.

The roles mentioned thus far are: NEO, raid, reinforcement, show of force, and tactical deception operations and are all examples of current types of amphibious operations. All these roles have been successfully demonstrated within the 1990s. The use of the LCAC has been integral to the operation or could have had an impact on the operation if it had been available. With the LCAC, another option for the commander to use in deciding the methodology for the prescribed operation is available. The following analysis will be the use of the LCAC in OMFTS, an untested doctrinal concept in amphibious operations.

Operational Maneuver From the Sea

As described in the first chapter, OMFTS involves utilizing maneuver space to an advantage. With the ability to out maneuver an enemy, a tactical advantage can be gained against an enemy's weakness. Described by Commander Terry Pierce, USN, the concepts of OMFTS include:

> Aim: Instead of terrain or casualties, the objective of maneuver warfare is to collapse the enemy's will to fight. It seeks to shatter the enemy's cohesion through a series of rapid, violent, and unexpected actions.

Enemy Critical Vulnerability: Warfare by maneuver stems from a desire to attack an enemy from a position of advantage rather than meet him straight on.

Tempo: Given sufficient time, an enemy will perceive threats to his critical vulnerabilities and take steps to make them either less vulnerable or less critical.

Surfaces and Gaps: An attack is quite simply, a bid to strike at an enemy's critical vulnerability by creating an advantage and then exploiting it.[9]

The concepts hold true in amphibious operations. Amphibious operations expand the maneuver space. Changes in strategy include Enemy Critical Vulnerability, Tempo and Surfaces and Gaps. Traditional World War II operations were mass against mass, with hundreds of landing craft often assaulting a prepared beach. The enemy would know where the attack was going to be; the element of surprise was when the attack would take place. Maneuver was accomplished after the beachhead was established.

Historically, landing sites were restricted by beach hydrography as well as the operating ranges of the landing craft being used. The objective of OMFTS is: "Using the sea, air, and land as one maneuver space, the aim of OMFTS is seamlessly to project the Marine air-ground task force ashore."[10] Meeting the objectives of OMFTS with conventional landing craft is not possible. A lack of seamless transition due to hydrography and slower speed exists with conventional displacement landing craft. The LCAC with its versatile operating characteristics provides the possibility of a seamless transition, no beachhead, or restricting gradient are required. The landing force is not going to have to debark in shallow water or adverse surf conditions. LCAC operations are swift and decisive in both operating speeds and characteristics.

A limiting factor in the full-scale execution of an amphibious assault is in the numbers of both platforms (LCACs) and amphibious shipping (LHD and LSDs) available. Current force structure calls for thirty-six amphibious ships as stated in the first chapter; structure will be twelve big decks (LPH, LHA, LHD), twelve LPDs and twelve LSDs, and about ninty LCACs. Lift capabilities if all ships were operating (theoretical due to ship maintenance) is about sixty-

six LCACs; placing LCACs on LSDs and LHDs is the normal configuration. The lift capacity for an LCAC is one M1A1 tank. So using the M1A1 as a measure, it can be shown that rapid buildup of firepower is severely restricted by current force structure. This then lends to OMFTS as the new strategy to be adopted due to the lack of lift. Mass on mass causes high attrition. With limited assets, a more elite type of warfare reducing attrition becomes a doctrinal requirement.

The LCAC provides the necessary hardware to support maneuver, offering the sea as maneuver space. "Viewing the sea as an avenue of approach, land forces rely on naval vessels to be the tactical sea maneuver force. Instead of long linear assault waves across broad beaches, we launch multiple probes across much narrower landing points."[11] The LCAC offers only one piece of the OMFTS scheme of maneuver. The other pieces are the Advanced Amphibious Assault Vehicle (AAAV) and the V-22 Osprey tilt rotor aircraft. Due to the vulnerabilities of the LCAC against a defended beach, the AAAV is required. The V-22 Osprey will replace the aging CH-46 helicopter giving the airborne movement more capability in OMFTS.

The LCAC in its ability to travel long distances and at higher speeds than conventional landing craft enhances OMFTS doctrine. The ability to quickly transit in the maneuver space provided in the littoral is a distinct advantage over enemy defensive capabilities. Doctrine is shifted from beachhead development in a central location to using a large-scale maneuver space to gain tactical advantage over the enemy. New doctrine calls for using equipment differently to provide the maneuver space. The LCAC is adapted in a logical sequence to support OMFTS, providing maneuver.

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[1]SSG Ronald Turner, Marines, Vol 23, August 1994, 15.

[2]Dennis C. Jett, Embassies Under Seige, ed. Joseph G. Sullivan, (Washington, London: Brassey's 1995), 138.

[3]Ibid., 139.

[4]Ibid., 140.

[5]Melvin R. Jones, LTC USA (Ret). "Continuing the Assault by Boat and by LCAC," Amphibious Warfare Review 10, no. 2 (Summer/Fall 1992), 14.

[6]Ibid., 14.

[7]Ibid., 7.

[8]Department of Defense, Conduct of the Persian Gulf War, Final Report to Congress, April 1992, 221.

[9]Terry C. Pierce, CDR, USN, "Operational Maneuver From the Sea," U.S. Naval Institute Proceedings 120, no. 8 (August 1994), 30-31.

[10]Ibid., 31.

[11]Ibid.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

Chapter one asked if the LCAC supported the current roles and missions of a NEF. This question is especially pertinent due to more commitments by naval forces in the littorals. Since LCACs operate in these environments, the evaluation of its utility becomes an even more critical question. In drawing a conclusion as to the evolving role of the LCAC in modern amphibious operations, two topics have been addressed. The first was the historical evolution of the landing craft in twentieth-century amphibious warfare. The second was the participation of the LCAC in recent expeditionary missions.

These topics demonstrated the utility of the LCAC is specific historical development and as a specific contributor to current missions. This study based on historical and current cases, addressed specifically the evolution of the LCAC from displacement to nondisplacement. The need for over-the-horizon operations as well was demonstrated as the threat from the shore increased. A review of the logical evolution of the displacement landing craft into the LCAC, matching the LCAC with the missions, threats to the LCAC, and future operations will answer the thesis. Recommendations based on the presented research will be the final aspect of this chapter.

Logical Evolution

Since the arrival of the landing craft in Gallipoli to massive amphibious landings during World War II to the war in the Falklands, amphibious warfare has depended heavily on the

ability of massing combat power ashore. The displacement landing craft has been the mainstay of the amphibious assault. With doctrine changing little since the 1930s, the landing craft has been the heavy-lift provider for amphibious operations. The normal events surrounding an operation include initial naval gunfire followed by simultaneous aerial fire support to soften up the beaches. To clear the boat lanes minesweeping was conducted prior to the assault. The purpose of all this preparation is to establish an attainable beachhead for the landing. Grand culmination in applied art of World War II and then technological challenge of nuclear weapons made amphibious mass too vulnerable to nuclear weapons, Inchon being the exception. Local wars and the and the utility of the helicopter would become more the rule of combat operations, examples being Vietnam, Falklands, and Desert Storm.

With the advent of the helicopter, a new method of delivering troops to the assaulted area has been added to the operation. The helicopter airborne ship-to-shore movement would be happening simultaneously with the waterborne assault. The first landing craft to be in the initial assault waves would be the armored AAVs. The purpose of the AAVs was to provide protection against the defended beach. The AAVs would be followed by the displacement landing craft, such as the LCU and LCVP. Launched close to shore the landing craft would be responsible for heavy lifting of equipment to the beach.

By using the helicopter in amphibious operations, the role of the landing craft changed. The primary method of moving troops was now the helicopter, although only able to carry about twenty troops at a time the helicopter was faster and had a greater initial range. With no beach hydrography constraints, the helicopter became the logical primary high-speed troop mover.

The landing craft could not be replaced by the helicopter. The ability to move heavy equipment, such as the tank, is still a necessity if required in amphibious operations. Doctrine

required a permanent beachhead that was dependent on firepower and heavier equipment--items that the helicopter is unable to lift.

While the helicopter evolved rapidly, the landing craft underwent little change. A technology gap started to occur. Lightly equipped troops could be quickly transported by helicopter into an area from greater range. However, equipment critical to the operation, such as tanks and vehicles, still had to arrive by way of landing crafts. An example of this was the problem that the First Air Cavalry had in Vietnam. Its infantry could assault anywhere. But it could not move armor, and its artillery could not move and shoot.

With the helicopters able to operate from over the horizon, the next step was to increase the speed and range of the landing craft. "Sea service leaders found it particularly vexing to be reminded of the capability long held by the Soviet Union and several Warsaw Pact nations to land their naval infantry well beyond the high-water mark by means of successive families of air cushioned assault craft."[1] Technology was not stagnant in landing craft development.

LCAC development may have been hastened by Soviet advances, but this is not an issue in this research. The sequence of LCAC construction was logical in that the technology existed well before the United States started production. An article by M. J. Hanley concerning the development of a high speed landing craft to be used by the Marines was introduced in naval journals as early as 1967. It would take until the late 1970s for the United States Navy to develop a prototype that could be used. Production of the LCAC would not be in full swing until the 1980s. "The LCAC was indeed a godsend, a surface craft at long last with speed, range, payload, and over-the-beach capability to materially enhance the amphibious assault."[2] The capability of high speed delivery of equipment to the beach enhanced marine missions. The equipment now could nearly match the arrival time of the troops being air lifted. A requirement

is introduced which in turn creates an innovation to meet the requirement. The LCAC's development was logical to military equipment development.

Another critical aspect is to evaluate the validity of the threat from the beach. The question of a need to operate from over the horizon is a logical question in determining the LCACs roles and missions. Although the first ASCM was used in the Arab-Israeli wars over ten years earlier, the British in the Falklands crisis were one of the first deployed forces to be struck by the devastation of the Antiship Cruise Missile (ASCM).

As weapons technology increases, defenses must keep pace to counter the threat. Defending against an ASCM near the shore is extremely difficult due to detection ranges. The problem is compounded by amphibious ships with large radar cross sections operating near the beach. Since current U.S. amphibious force structure is only thirty-six ships, a single loss could prove devastating to an operation. The necessity of operating further from a hostile shore is essential to ship survival. Remaining covert by operating over the horizon, undetected from an enemy, provides the commander a distinct advantage. If the commander is forced to bring his amphibious task force shipping from over the horizon to within three miles of the beach to land equipment and supplies, surprise is obviously lost. The threat is from not only ASCM but also long-range coastal artillery.

Concealment is provided for the amphibious task force by the LCAC's ability to operate from over the horizon. Since operating at higher speeds and greater ranges is what is required for modern maneuver warfare, the LCAC is well suited. "The LCAC also lent itself nicely to the concepts of maneuver warfare being espoused by analysts like William Lind and members of the Military Reform Caucus in Congress."[3]

The LCAC development proceeded logically from the threat and mission needs at the time. As requirements changed, demands were made and production resulted in the landing craft

air cushion. Military thinkers were able to see past the European scenario which called for a predominate ground and air force. The naval option in this scenario was the Norwegian Flank and reinforcement operations. With the LCAC's greater operating speed and range, the airborne and waterborne ship-to-shore movement could be conducted from over the horizon. Operating at a greater distance from land provided critical safety for amphibious shipping. The future was going to be in operations (perhaps noncombat) against a third world foe. An enemy possessing high-technological weaponry able to be projected against shipping. The Falklands would point to the threat from ASCM or land-based aircraft.

Landing Craft Air Cushion and Mission Match

With the historical development of the LCAC examined, it was demonstrated that the LCAC fulfills today's amphibious requirements. Today's missions as reviewed in chapter five included noncombatant evacuations, raids, show of force, and reinforcement operations. The LCAC was examined and proven to be in most cases the most effective platform for the operation. In concluding the analysis of the LCACs performance, two questions are summarized. The first question being if the LCAC enhanced or detracted from the mission? Furthermore could the mission have been accomplished with displacement landing craft, such as the LCU or LCM?

In the case of a NEO, the study addressed the Liberian case. With no beach survey being conducted, the success of the operation, if relying on landing craft, would have been suspect. Displacement crafts require a beach survey, but the LCAC does not. Therefore, the prospects for a mission success would have been enhanced if a waterborne operation had been conducted with the presence of the LCAC. However, the mission was carried out successfully by helicopters, due to the location of the embassy, without the use of any landing craft. The mission could have

been conducted with displacement landing craft if the survey had been conducted and if the location of the embassy would have afforded a waterborne evacuation. This would, however, have required the ship closing the beach and operating at greater risk. Therefore, in a final evaluation for the operation, LCACs have important operational features that could have increased the number of options available to the commander. The mission could have relied on displacement craft and likely succeeded; however, amphibious shipping would have been placed at some risk.

Another example was the show of force operations conducted by U.S. amphibious forces during Desert Storm and Desert Shield. The LCAC participated in the rehearsals and demonstrations that were conducted. It is hard to determine if Saddam Hussain knew the capabilities of the LCAC. With a show of force it is obviously more credible if the units are easily visible to the opposing force.

The LCAC although capable may have detracted from the show of force in the Gulf. Other than creating a fairly huge plume of water and loud noises, the impact the LCAC had could be assessed as minimal. Since the emphasis of amphibious operations in the Gulf was overt, the operation was conducted with displacement craft. Typically for a show-of-force operation, the more an enemy sees of your capabilities, the better. The displacement landing craft could have easily handled this operation.

The final example discussed involved conducting a raid. Recent exercises, involving the LCAC in conducting a raid, have shown the LCAC to be extremely effective. With a high speed of transit and over-the-horizon capability, the covertness of a raid can be achieved. Detractors from this are the LCACs noise and infrared signatures. These signatures may make the LCAC more detectable with limited high-technological detection equipment. However, this equipment is still limited to or less than line of sight. An LCU operating at slower speeds from thirty

nautical miles away from the landing site would require hours to transit to the site. A LCAC operating from the same range would only require half an hour, a substantial saving of critical time. The LCAC enhances the speed of any amphibious operation. The limit is in the load that the LCAC can carry. An LCU can carry eight light armored vehicles where an LCAC can only carry four. The difference in lift is overcome by increasing the number of LCACs used in the operation.

Landing Craft Air Cushion Threats

The LCAC faces threats similar to other landing craft. It creates a significant heat signature that is detectable by infrared sensors and operates at a high noise level. The heat signature could provide targeting to an enemy, and noise can be detected by acoustical devices. While the conventional landing crafts have engine exhaust, the level of infrared is less than the LCAC. The larger heat signature comes from the gas turbine engines that the LCAC uses for propulsion.

Mining poses a threat to all landing craft with displacement craft being more susceptible than the LCAC due to their draft. The LCAC since it is riding on a contained cushion of air is less vulnerable to some types of mines. The threat from mines as the landing craft approach shallow water is significant. Naval forces have an extremely difficult time detecting mines in shallow water. A new threat to landing craft, especially the LCAC, is land mines due to their capability of operating over land. Other threats to the LCAC include small caliber fire, which can cause damage to the LCAC operating surfaces. Damage to the cushion or the propulsion blades can cause the LCAC to fail. The amount of damage has to be a significant amount especially to the cushion; however, it is a vulnerability not shared by craft, such as the LCU. Since the LCAC engines are similar to aircraft engines, they operate at higher speeds and are

susceptible to foreign object damage. This damage can cause a catastrophic failure to the engine making the LCAC inoperable. However, the LCAC has been designed to shield critical entry points for the foreign object damage, such as small arms fire.

With the LCACs operating from over the horizon, command and control becomes more difficult. This is due to the line of sight communications that is typically used in amphibious operations. As communications technology advances, this is going to be less of a disadvantage to LCACs. Current deployed LCACs use the global positioning system and a new system the AN/KSQ-1. These are two fielded systems that provide a useful communication data link, allowing for better command and control between amphibious shipping and the LCAC. While the LCAC faces threats from various weapons of advanced technology, detection and avoidance will still be the mainstay of craft preservation.

Future Operations

The future roles of the LCAC in amphibious operations appear substantial. The current doctrinal revolution in amphibious operations associated with OMFTS fully supports the present role of the LCAC. The LCAC makes maneuver warfare possible with its higher operating speeds. Conventional displacement landing craft were never intended for maneuver warfare. Since maneuver warfare from the sea requires high speed with the ability to maintain covertness, the LCAC is the ideal waterborne platform based on its operating characteristics.

An example of maneuver warfare using slower displacement landing craft was during the Sicily campaign of World War II. American forces would maneuver through amphibious landing to outflank the German enemy. However, enemy command and control as well as surveillance have greatly improved since 1944. Most potential enemies have a surveillance

capability out to the horizon and in most cases farther than the horizon. Surveillance can be used to detect amphibious shipping or slower landing craft.

Since OMFTS involves being able to conduct a rapid seamless transition from water to shore, it uses the idea of a triad of amphibious vehicles. To fulfill OMFTS doctrine, the MV-22 Osprey and the Advanced Amphibious Assault Vehicle (AAAV) need to enter the fleet completing the triad mentioned in chapter one. Operating at higher speeds from over the horizon, the AAAV provides an assault capability with armored protection to the initial landing forces. The MV-22 Osprey a tilt rotor aircraft which will replace the aging CH-46 Sea Knight helicopter; like the LCAC, the Osprey is a better platform for conducting over the horizon missions. With all three platforms operating in unison, the tenants of OMFTS can be fulfilled.

The LCAC was initially built in the early 1980s with the final LCAC completed in early 1996. However, the AAAV and MV-22 are not predicted to come into service until the year 2004. The LCAC will be reaching its twenty years of service life when the AAAV and MV-22 enter the fleet. .This gap in programs may create a significant maintenance issue. A look at the numbers reveals that the problem of obsolescence may be small. Since approximately ninety LCACs were built, a comparison of present and predicted amphibious ship capability reveals that not all the LCAC will undergo extreme operating conditions. With current amphibious lift assets, only sixty LCACs can be lifted at any given time. This is based on thirty-six amphibious ships and on only LCACs used for the operation. The remainder of the LCACs are being stored or cycled in maintenance, therefore reducing operating times for the LCAC. As far as service life issues, the LCACs undergo extensive corrosion control measures similar to aircraft. Overhaul cycles are such that the availability of reserve LCACs allows maintenance to be accomplished in a scheduled manner.

In comparison to LCU numbers, seventeen LCUs per coast, the LCAC has not been overly operated to the point of being detrimental to service life. The operating nature of the craft is not subjected to the harshness of displacement operations. The LCAC, like aircraft, is at risk from foreign object damage; a risk the LCU does not share. Since hovercraft technology has existed for over thirty years, few technological uncertainties exist that have not been predicted or researched to prevent detrimental operation or damage to the LCAC. Hovercraft technology has matured, and a major breakthrough in the technology will not be seen in the next decade. The LCAC technology is evolutionary vice revolutionary in nature; therefore, the LCAC will not become obsolete in the next twenty years from an operational standpoint.

Will the LCAC's technology become outdated? The only current challenge to the technology is the Wing in Ground (WIG) technology that currently exists and being further developed by the former Soviet Union countries.

> The "Caspian Sea Monster," the experimental wing-in ground effect vehicle, revealed another intriguing development in amphibious warfare technology. These craft, which resembled large flying boats, were designed to fly in "ground effect" over water and make landings. The Orlan demonstrated a capability of transporting several hundred naval infantry troops and two light tanks at a top speed of 350 knots and operating range reportedly 4,300 nautical miles. [4]

The size of this craft is much greater than the LCAC. Obviously with more speed and a greater operating range than the LCAC, the operational capability of the WIG is of interest to amphibious planners. Deploying "smaller" WIG crafts currently does not exist; therefore, the current WIG is a stand-alone independent amphibious craft. Comparison to the LCAC and other landing craft, technology may not be justified due to the premise of the WIG vessel operating independently. Granted WIG technology may challenge amphibious shipbuilding design, it cannot really be compared to the LCAC as a mature and stable system.

Recommendations

As amphibious warfare continues to evolve into OMFTS; roles and missions for the LCAC will continue to change. The days of hundreds of landing craft assaulting a defended beach in a grandiose amphibious operation are a memory. The high price tag of amphibious shipping as well as craft, such as the LCAC, prevent large-scale production by most nations. Therefore, U.S. weapons must be smarter and perform greater than the potential enemies. The LCAC is currently that piece of equipment for the NEF. The LCAC is highly versatile and unchallenged as a landing craft by any other present-day navy. Even though the Russians are fielding hovercrafts in small numbers, the U.S. is unchallenged as a deploying force.

Recommendations include continuing with the LCAC as the primary waterborne ship-to-shore movement craft. Secondly, expedite delivery of the AAAV and V-22 into the amphibious inventory. Operational maneuver from the sea is a hollow doctrine without these two systems. The LCAC is not the only answer to amphibious lift in OMFT. The longer it takes AAAV and MV-22 to come into service, the older the LCAC becomes, and the more hollowed OMFTS becomes as a doctrine.

As technology evolves, the LCAC's capabilities will continue to expand and new missions for the LCAC will be found. "The use of global positioning systems with new night vision devices aboard high speed landing craft will permit transit along narrow, cleared lanes through minefields toward and across an unexpected landing point."[5] The future for the LCAC is now; as more operations are turned into doctrine, the roles and missions will continue to match the platform in all aspects.

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[1]Joseph H. Alexander, and Merrill L. Bartlett, Sea Soldiers in the Cold War: Amphibious Warfare, 1945-1991, (Annapolis, MD: Naval Institute Press, 1995), 79.

[2]Ibid., 80.

[3]Ibid.

[4]Ibid., 153.

[5]Ibid., 175.

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